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## SHORT CASES IN CARDIOLOGY

# Direct evidence of patent foramen ovale as a route for paradoxical embolism

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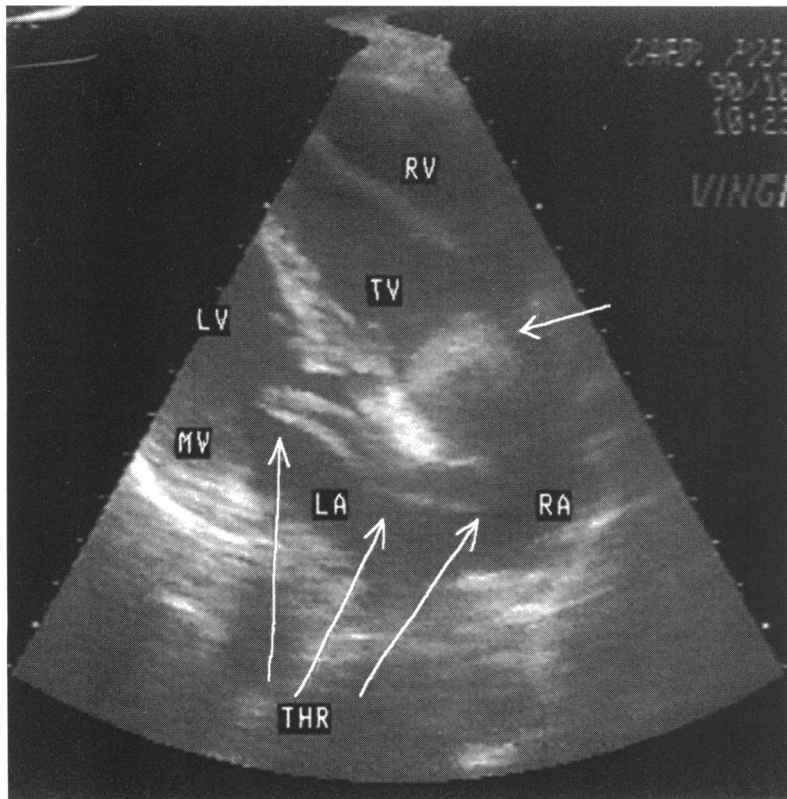
A 83 year old woman was transferred from the department of surgery because of a syncopal attack with hypotension. Twenty days before she had had a palliative operation for gall bladder adenocarcinoma with hepatic invasion. Some days later she had had an ischaemic stroke in the middle cerebral artery territory, which was confirmed by computed tomography. Carotid ultrasonography showed no stenoses. Despite these clinical events and prolonged immobilisation, she could be treated only with low-dose subcutaneous heparin because of postoperative gastric

haemorrhage which required blood transfusions. Transthoracic echocardiography (TTE) showed a thrombus abutting the tricuspid valve and crossing a patent foramen ovale to reach the left atrium and mitral valve (figure). A Doppler estimate of right ventricular systolic pressure was about 75 mm Hg.

A patent foramen ovale is a risk factor for ischaemic stroke<sup>1</sup>; indirect evidence of its role as a route for paradoxical embolism through a right-to-left shunt stems from case-control studies.<sup>2,3</sup> A direct role is difficult to demonstrate,<sup>4</sup> because diagnosis of paradoxical embolism is based upon indirect criteria,<sup>5</sup> and documentation of a patent foramen ovale itself usually requires transesophageal echocardiography, with intravenous saline contrast when necessary.<sup>1</sup>

This patient had several risk factors for deep vein thrombosis, such as old age, adenocarcinoma, recent surgery, and prolonged immobilisation: but she also had contraindications to antithrombotic therapy.<sup>6</sup> The shape of the thrombus indicated a venous genesis. Pulmonary hypertension probably forced open the foramen ovale,<sup>5</sup> leading to an interatrial shunt. The thrombus across the interatrial septum may explain the ischaemic stroke and confirm the role of patent foramen ovale in paradoxical embolism, especially in the presence of pulmonary hypertension.

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Transthoracic echocardiogram (modified right ventricular inflow tract view, diastolic frame) showing the thrombus (THR, arrows) abutting the tricuspid valve (TV) and crossing the interatrial septum at the level of foramen ovale to impinge on the mitral valve (MV). RV, right ventricle; LV, left ventricle; RA, right atrium; LA, left atrium.

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